SDE CIRCUIT DESCRIPTION

The SDE circuit is shown on three diagrams. The SDE main circuit, the SDE output circuit and SDE headphone circuit.

SDE MAIN CIRCUIT

The SDE main circuit shows the main CPU, A – D circuitry, program memory and user RAM, address decoding, voice generation chips, voice generation dac's, display latches and ports, midi in and out circuitry.

IC13 is an 8031 eight bit micro controller running at 12 MH. It controls all the functions on the SDE. The machine program is stored in IC11, a 16 KB Eprom. There is 8KB of battery back RAM which is used by the 8031 as working RAM and also is used to stored user variables. The 8031 also handles midi in data as well as the multiplexed A – D from the control pots and the variables for the voicing circuitry.

IC25 is the address decoding for the SDE and takes the three top address A13, 14 and 15 and decodes them into eight 8KB blocks as follows: The lowest 16K (Y0 and Y1) are not used. Y2 (16 – 24 k) is used to enable the user RAM IC1. 24 – 34 k (Y3) is used to enable voice 1 – 3. Y4 is used to enable voice 4 – 6 Y5 and Y6 are and'd together to enable the cartridge memory expansion (16k) and Y7 is used to enable port IC23 which is used to light some display LEDs and seven segment displays.

CONTROL POTS

There are six variable control pots RV7 to RV12 which are used to control various functions within the SDE. These are read by a D – A convertor IC7 used in A – D configuration. The pots are multiplexed to the A – D via an eight channel analogue multiplexer IC6. Each pot is looked at in turn and the processor IC13 carries out a successive approximation on each of the pots as follows: Processor outputs the MSB to the D – A and then tests the comparitor input, pin 11, to see whether the value on the other input of the comparitor IC8 is higher or lower than the value currently being outputed. It then repeats this until all the bits have been cleared or set to form an eight bit word. This word is then the value set on the control pot.

POWER UP / POWER DOWN

Data is protected during power down by battery backup BT1 which provides 3.6 volts to the RAM via D22. The battery is overridden by the main power supply via D21 during power up. The chip enable of IC1 is held high during power up and power down by IC26 which works as follows: Unregulated DC is taken from the rectifier of the power supply, before smoothing, to the anode of D5. With power off D6 discharges C47 to ground via R33. During power up the unsmoothed signal from the secondary of the transformer charges C33 via D5 and R48. Approximately 1 second after power up IC26 pin 3 goes low as C47 reaches the threashold of the gate. Note that IC26 is a CMOS nandgate powered from the battery. This forces pin 6 high which then allows chip select signals via IC26 pin 10 to enable the CE (pin 20) of IC1. As soon as power is removed C47 discharges through D6. Pin 3 IC26 goes high forcing IC1 pin 20 to go high before the main power supplies have decayed to 0V. This prevents any false writing to the RAM during power up and power down.

VOICING

The voicing on the SDE is carried out by two digital voice generators, IC2 and IC3. The processor, IC13, treats these voice generators as ports simply writing the various data to them to form the various perameters of the sound required. On board each of these chips are two general purpose ports which are used to read the front panel switches in the case of IC2 and to light some of the LEDs in the case of IC3. The footswitch is paralleled up to two inputs of IC2 and carries out a parallel function to the up/down button on the front panel.
The output from IC2 and IC3 is a serial bit stream which is fed into IC17 and IC18 respectively.
IC17 and IC18 are serial digital to analogue convertors which take the serial stream and construct an analogue voltage proportional to 8 bits of the stream, thus the processor sets up the various parameters of the sound and IC2 and IC3 output the digital serial stream equivelant to that sound. IC17 and 18 construct the analogue wave form from this signal. The output from IC17 and 18 are buffered and sent to the output circuit.

MIDI

The SDE is a midi slave unit and does not have a midi out. Midi in signals are received through P4 and sent to the processors UART via IC24. The opto isolator IC9's output is also fed back to the midi through socket via IC5.

OUTPUT CIRCUIT

The audio outputs from IC17 and IC18 are fed into 2 filter and amplifier cicuits IC11 via C20 and C23. These filters cut out some of the high frequency sample noise inherent in the system. The output of IC11 pin 1 is fed into one half of a gain cell, IC10. The output of IC11 pin 8 is fed into the other half of IC10. IC10 pins 3, 4 and 8 handle the output volume for voices 1 - 3 while IC10 pins 14, 13 and 9 handle the output volume for voices 4 - 6. The gain cells are used for overall volume control as well as squelch (when the voice generators have finished outputing the signal, the gain of the cells is reduced to 0 'squelching' the output). The control voltage for the gain cells is derived by rectifying a square wave produced by the voice generators IC2 and IC3. This square wave is rectified by D25 voice 1 - 3 and D26 for voice 4 - 6. The DC voltage derived from the rectification is fed into the gain cells current controlled input via R70 for voice 1 - 3 and R71 for voice 4 - 6. The audio outputs from IC11 pin 1 and IC11 pin 8 are fed to a rectifier D10 and D8 and smoothed by C25 and C21 to form two DC signals proportional to the output voltage of the audio wave forms. These two DC signals are fed back to the multiplexer input IC6 and these DC signals can be read by the 8031 CPU, IC13. These signals are used to tell the processor when the voice generators have finished outputing sound so that it can operate the squelch circuit.

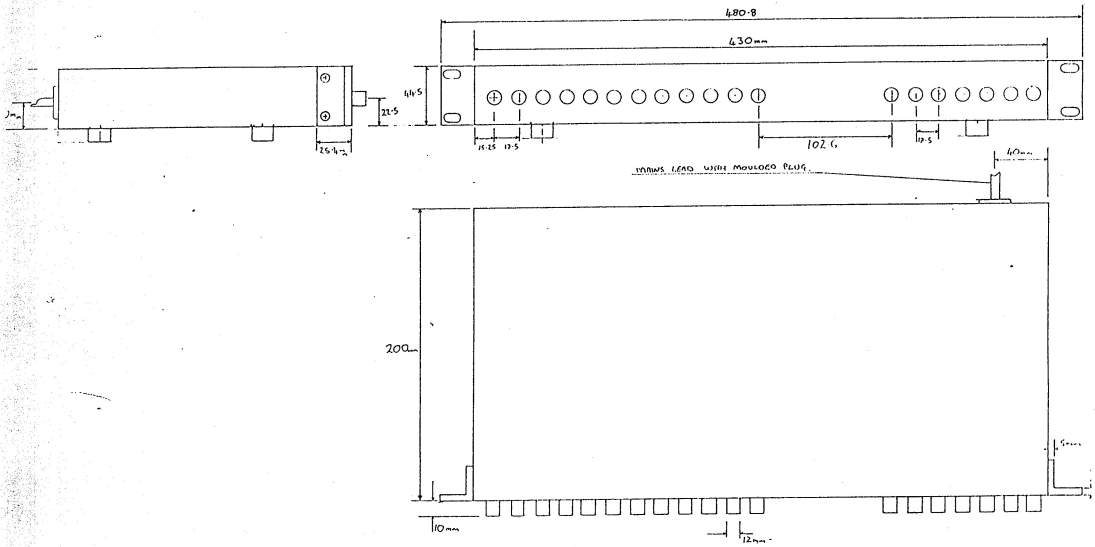
The outputs from voice 1 - 3 are fed to P9 and the voices 4 - 6 are fed out of P12. When there is no jack plugged into P9 then the signal from voice 1 - 3 is summed at the output of P12 so that P12 can be used as a master ouput for voices 1 - 6. The signal present at the positive side of C34 and C35 is sent to the headphone circuit which amplifies the signals further and feeds it to a 600R headphone socket on the front of the unit.

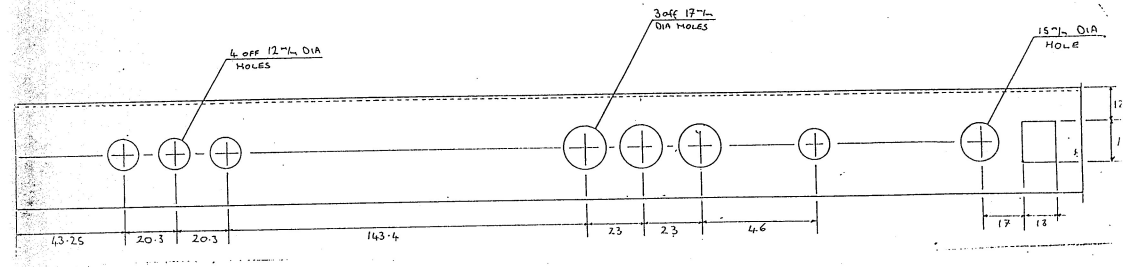
TAPE IN/OUT CIRCUITRY

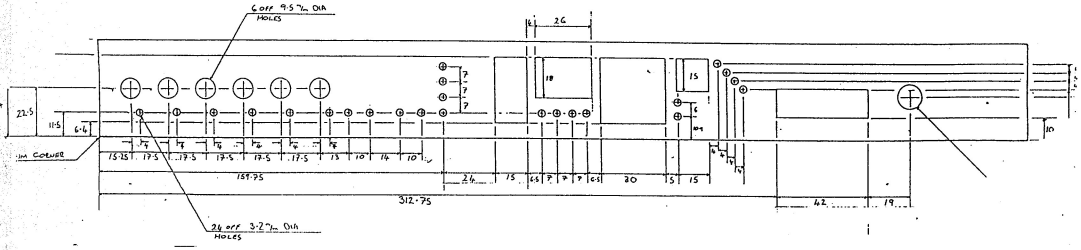
The user RAM can be dumped to tape using the Tape Out socket. As with midi the data is converted into serial stream and sent out of the UART transmit pin, pin 11. C95 removes the DC component of the square wave and R37, R25 reduce the level to an acceptable signal for cassette tape recorders.

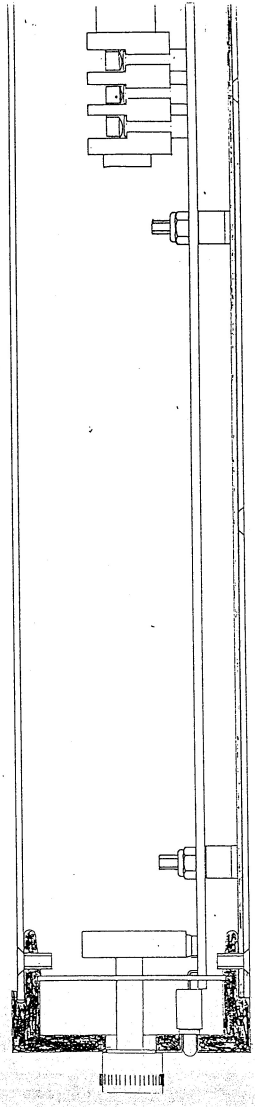
When a tape is played back into TMI from the cassette players earphone socket D1 and D2 limit the signal to approximately half a volt in amplitude whilst IC8 amplifies it to TTL threashold levels and D57 prevents negative going signals from entering the CPU.

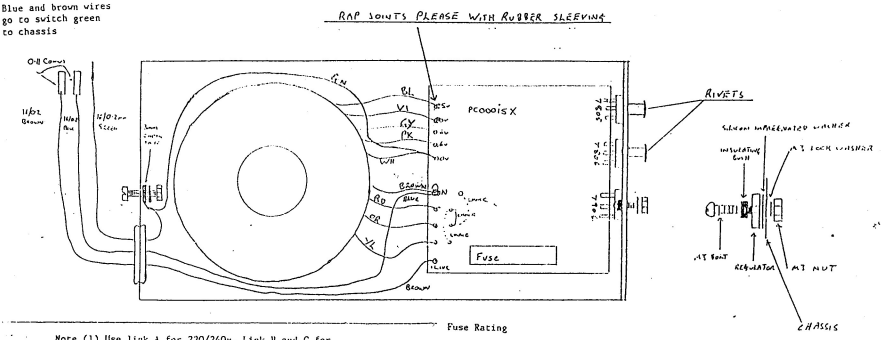
1U OVERALL CASE DIMENSIONS SCALE 1:2




4 OFF 12½ DIA HOLES
3 OFF 17½ DIA HOLES
15½ DIA HOLE
43·25
20·3
20·3
143·4
23
23
46
17
18


6 off 9.5 m. Dia HOLES
24 off 3.2 m. Dia HOLES
26
18
15
10
22.5
11.5
6.4
15.25
17.5
19.5
13
10
14
157.75
24
15
65
30
312.75
42
19





Note (1) Use link A for 220/240v, Link B and C for 100v/110v. Note (2) Each connection to PCB must have Heat Shrink sleeving.

Fuse Rating

1 Amp 220/240 2 Amp 100/110v

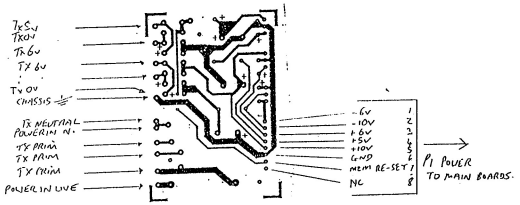
NOTES

SIMMONS ELECTRONICS LTD.
UNIT 11 ALBAN PARK
ST ALBANS
HERTS

TITLE
IV PSU. ELECTRICAL ASSY.

DRAWN A.C. DATE 6/1/86

SCALE DRNG Nº



NOTES

THIS IS A VIEW THROUGH TOP OF PRINTED CIRCUIT BOARD WHEN ARTWORK ARRIVES BACK I WILL MAKE THE VIEWS CORRECT

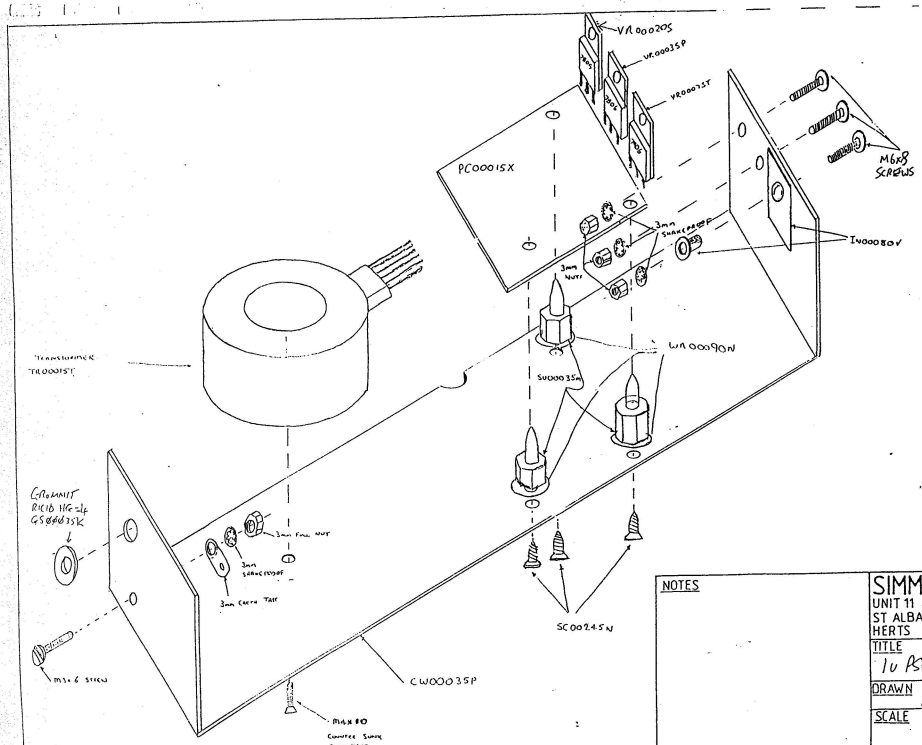
A P Cubbs 16.1.86

SIMMONS ELECTRONICS LTD.
UNIT 11 ALBAN PARK
ST ALBANS
HERTS

TITLE UNIVERSAL POWER SUPPLY
TRACK LAYOUT – TRACK VIEW

DRAWN DS DATE 8/1/86.

SCALE DRNG Nº IV PSU·5



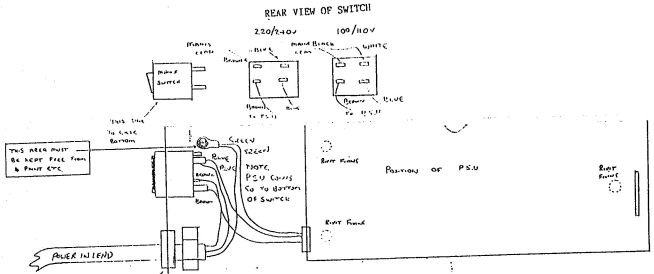
NOTES

SIMMONS ELECTRONICS LTD.
UNIT 11 ALBAN PARK
ST ALBANS
HERTS

TITLE: 1u PSU MECHANICAL ASSY.

DRAWN: A.C DATE: 6/1/86

SCALE: DRNG Nº: 1U PSU·4



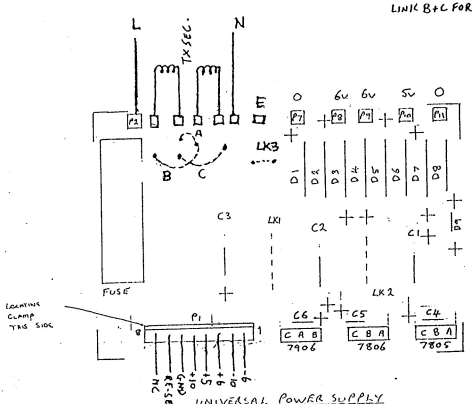
NOTES

SIMMONS ELECTRONICS LTD
UNIT 11 ALBAN PARK
ST ALBANS
HERTS

TITLE
1 U CHASSIS – POWER CONNECTION

DRAWN A.C. DATE 7/1/86.

SCALE DRNG Nº 1U-10



	DRILL SIZE
C1 2200mF 16V RAD	1mm
C2 2200mF 16V RAD	"
C3 2200mF 16V RAD	"
C11 1mF TANT	"
C5 1mF TANT	"
C6 1mF TANT	"
D1 1N4001/2	"
" 2 "	"
" 3 "	"
" 4 "	"
" 5 "	"
" 6 "	"
" 7 "	"
" 8 "	"
8 WAY MALE	1:1
FUSEHOLDER	2:0
REG. 7805	1mm
" 7806	"
" 7906	"
22SWG LINK WIRE L1/3	"
VERO PINS P2-P11	1:3
D9 1N4001/2	

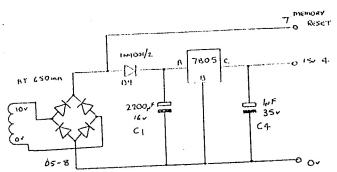
NOTES

SIMMONS ELECTRONICS LTD.
UNIT 11 ALBAN PARK
ST ALBANS
HERTS

TITLE
IU PSU PCB COMP. LAYOUT

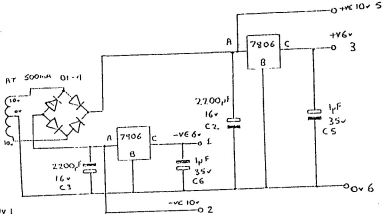
DRAWN A.C. DATE 2/1/86

SCALE DRNG N° IU PSU-2



NOTE

This regulator must be mounted with an insulating kit



For 240v omit links B and C

Insert A for 100v | omit link A and insert B and C

Fuse Rating

1 Amp for Europe
2 Amp for America and Japan |

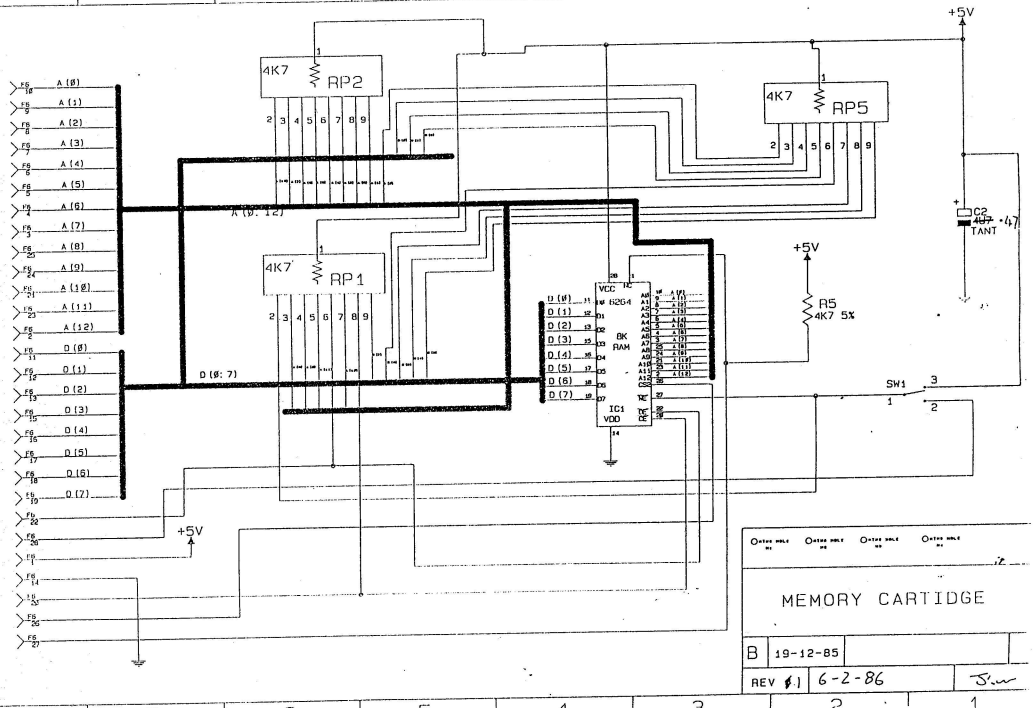
NOTES

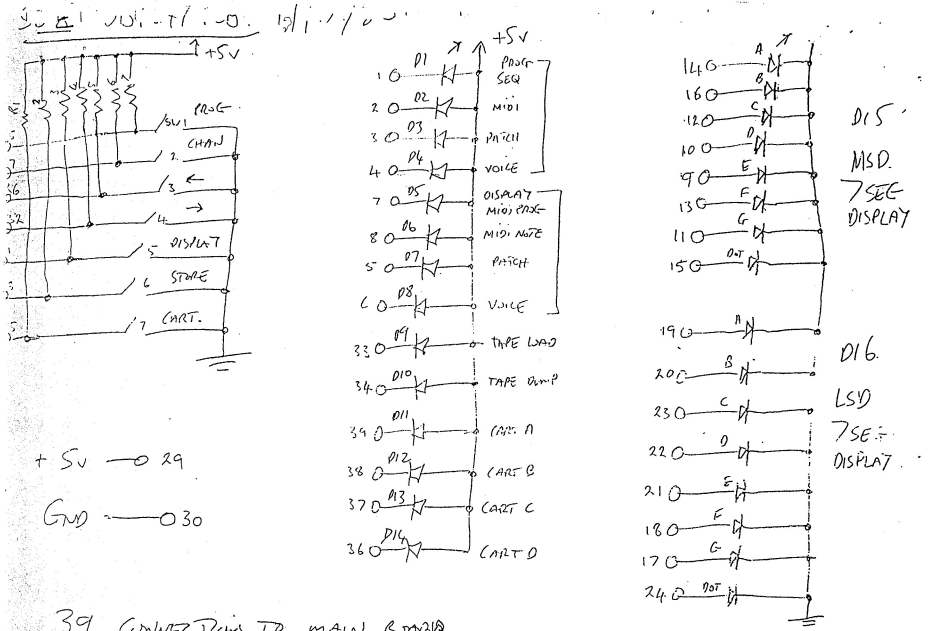
SIMMONS ELECTRONICS LTD.
UNIT 11 ALBAN PARK
ST ALBANS
HERTS

TITLE: 1U PSU CIRCUIT DIAG.

DRAWN: A.C. DATE: 7/11/86

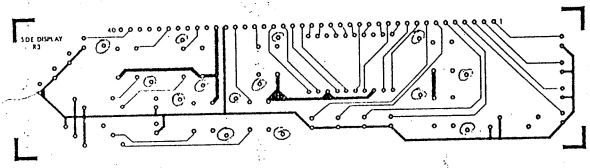
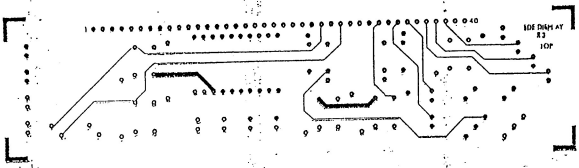
SCALE: DRNG Nº: 1U PSU-1


4K7
RP2
4K7
RP5
4K7
RP1
+5V
C2
.47
TANT
R5
4K7 5%
SW1
A (0)
A (1)
A (2)
A (3)
A (4)
A (5)
A (6)
A (7)
A (8)
A (9)
A (10)
A (11)
A (12)
A (0: 12)
D (0)
D (1)
D (2)
D (3)
D (4)
D (5)
D (6)
D (7)
D (0: 7)
IC1
VDD
8K
RAM
MEMORY CARTIDGE
B
19-12-85
REV #1
6-2-86



39 CONNECTIONS TO MAIN BOARD.

11-2-86

1/32 MATERIAL PTH ALL OTHERS 0.8mm
WITH LEGEND

3mm